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# Integrated review of the thematic cluster of mining, chemicals, waste management, transport and sustainable consumption and production in small island developing States

## Report of the Secretary-General

*Summary*

The present report reviews the status of progress in small island developing states towards implementation of the Mauritius Strategy for the Further Implementation of the Programme of Action on the Sustainable Development of Small Island Developing States, with specific focus on transport, waste management, chemicals, mining and sustainable consumption and production. The report is prepared in fulfilment of the mandate of the Commission on Sustainable Development at its thirteenth session, whereby a special one-day session on small island developing States will be convened by the Commission during its review sessions, to consider progress towards the sustainable development of small island developing States, within the framework of the thematic cluster under review by the Commission.

The report also describes continuing challenges which small island developing States face in their effort to advance implementation of the Mauritius Strategy as a basis for consideration of the way forward. It should be read in conjunction with the report of the Secretary-General on the review of the Mauritius Strategy of Implementation, also before the Commission at the current session (E/CN.17/2010/9).

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# I. Introduction

1. Small island developing States share many of the characteristics of other developing countries. Yet, they face unique and special challenges. The social, economic and natural systems of small island developing States are among the most vulnerable in the world. Thus, the particular vulnerabilities warrant special treatment of those States. Priorities set within their development strategies are expected to be different from those of other developing countries. Managing risks related to the intrinsic parts of vulnerability is a key for promoting sustainable development in small island developing States.

2. In view of the special vulnerabilities and the resulting need for special treatment of those States, the Commission on Sustainable Development at its thirteenth session mandated that at each review session the Commission assess the status of implementation of the Mauritius Strategy for the Further Implementation of the Programme of Action on the Sustainable Development of Small Island Developing States, focusing on the thematic cluster under consideration in each biennial cycle. The present report provides such a review for the eighteenth session of the Commission and focuses on the themes of (a) transport, (b) waste management, (c) chemicals, (d) mining, and (e) sustainable consumption and production patterns.

3. The present report summarizes the impact of mining, chemicals, waste management and transport on the carrying capacity of small island developing States, and the efforts of the States themselves to address these issues through policies and concerted action. It highlights the challenges that are specific to small island developing States rather than common to most developing countries.[1] Small size, ecological fragility, limited carrying capacity and other intrinsic characteristics continue to undermine the efforts of those States to promote sustained development and mobility, while improving efficiency, and minimizing waste and the use of toxic materials.

4. By almost any conceivable measure, small island developing States are among the world's "hotspots" in terms of sustainable development. The vulnerability has been increased by the adverse impact of climate change in all its manifestations, and it has again been demonstrated by the impacts of the global financial crisis of 2007-2010, the food and fuel crises of 2007-2008, and the large-scale natural disaster events of 2009-2010. Building largely upon traditional social systems, the resilience and capacity to cope is thus further lagging behind the increasing vulnerability in many small island developing States. In many cases, the benefits of improved economic and governance capacity have been more than offset by reduced resilience due to maladaptation to the increased frequency and severity of shocks.

5. It should be noted that the issues and actions under the selected themes for the eighteenth session of the Commission on Sustainable Development are especially closely linked in the case of small island developing States, in which interlinkages need to be considered in evaluating policies and programmes, in view of the low carrying capacities of the systems of those States.

[1] In the present report the theme of chemicals is covered in conjunction with waste management owing to strong interlinkages. It should also be noted that the issue of chemicals was not identified as one of the 19 themes covered by the Mauritius Strategy.

6. The report should also be considered in conjunction with the report of the Secretary-General on the review of the Mauritius Strategy of Implementation (E/CN.17/2010/9), which provides a global overview of the five-year review of the implementation of the Mauritius Strategy on the basis of national and regional assessments conducted early in 2010.

# II. Transport

## A. Trends and emerging issues

7. By far the most important transport modes for small island developing States are air and maritime transport. For geographical reasons, national road networks are not well developed and no significant railway networks exist.

8. In an analogy to landlocked countries, small island developing States can be called "sea-locked". While maritime transport is typically much cheaper than land transport owing to the large economies of scale that can be realized with modern container and bulk ships, transport volumes for most small island developing States are too low to fully benefit from modern shipping technology and practices. Low volumes combined with the large geographical distances and modal discontinuities (even for short overland distances) typically add up to high freight and logistics costs. For example, in February 2010, the typical shipping cost for a standard 20-foot container from Nagoya, Japan, to Port Vila, Vanuatu, was $4,700 compared to $1,100 to Brisbane, Australia (which is a similar geographical distance), it was a mere $450 to Laem Chabang, Thailand, compared to $5,400 to Kingstown, Saint Vincent and the Grenadines.[2] Low volumes and large distances also imply high air-transport costs and lower frequency of flights. Such enormous and widening differences are important factors of overall competitiveness of small island developing States in a globalizing world in which logistics costs have overtaken custom tariff levels as the key elements of trade costs. Typically, logistics performance is significantly worse in small island developing States than in other developing countries at similar levels of development, as evidenced by the World Bank 2010 Logistics Performance Index. Of the 11 small island developing States for which that index is available, 9 are at the bottom of the list of 50 worst performers in terms of logistics, 3 small island developing States are among the 10 worst performers in the world with overall performance only about one third of that of the best performer, Germany.[3] In part, this is a direct consequence of the low transport volumes which exacerbate the disadvantage of geographical distance.

9. On the other hand, some small island developing States have made significant progress in terms of increased transport volumes. For example, container port traffic has roughly doubled in many such States from 2001 to 2007 (e.g., in the Dominican Republic, Jamaica, Mauritius, and Trinidad and Tobago), which is similar to increases in Singapore and other Asian emerging economies. In the Bahamas, container port traffic almost tripled from 2001 to 2007. However, it should be noted that such success was in contrast to stagnating container flows in small island developing States on the spokes of the emerging hubs-and-spokes system of container flows. From 2000 to 2007, air freight in terms of ton-kilometres increased

[2] See www.japan-partner.com/car-shipping-cost.php.

[3] See http://go.worldbank.org/88X6PU5GV0.

in 9 of 23 small island developing States for which data was available, while it more than halved in some of the poorer small island developing States, which was due partly to increasing oil prices. International tourist arrivals have fluctuated dramatically from year to year, in response to the series of disasters, perceived health risks, security issues, and economic crises. In some small island developing States, cruise shipping and the related tourism travel is emerging as a major sector with a potentially significant developmental impact.

10. It should be noted that increased transport services and volumes for some small island developing States that have become hubs for air and maritime transport (e.g., Fiji, Bahamas) have come partially at the expense of further marginalization of some of the spokes in the emerging regional transport systems. The problem has been exacerbated by the move towards infrastructure services liberalization and increased private sector participation and offset some of the otherwise beneficial impacts of these trends and greater transport volumes. Similarly, the viability of transport services for remote islands within many small island developing States has continued to be a major challenge.

11. Safety of shipping has been high on the agenda, in view of major shipping accidents, such as those in Kiribati and Tonga in 2009. There is a perceived need for better accident investigation processes, including potential regional agreements on search and rescue and border patrolling. Other shipping challenges for small island developing States include transport security, international piracy, seafarer employment, training requirements, and international legal issues.

12. In contrast to many other developing countries, land transport has been of lesser importance for small island developing States, especially those with small land areas. Road budgets are typically small, and air pollution from land transport considered relatively less important. However, in some small island developing States the development of road transport continues to pose considerable challenges, especially in terms of raising the financial resources for road construction and maintenance, public-private partnerships, transport services regulation, and increasing traffic volumes on comparatively small road space. Road safety has become a serious issue, for example, in the Dominican Republic, Fiji, Papua New Guinea, Jamaica and Saint Lucia.

## B. Policies and programmes

13. On the global level, the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) have provided support to small island developing States primarily in the area of increasing security of maritime and air transport in line with new international standards introduced in recent years. While considerable work has been done to improve standards, more efforts and funding are needed to support compliance with ICAO and IMO standards in many of those States.

14. On the regional level, significant progress is reported especially from the Pacific. In 2004, Forum Leaders endorsed the Forum Principles on Regional Transport Services to underline the importance of the provision and maintenance of regular, reliable and competitive air and shipping services. The Principles recognized the challenges of increasingly competitive markets and new international safety and security requirements. In 2005, the Pacific Aviation Safety Office was

established, followed by the adoption of the Pacific Islands Air Services Agreement. Shipping services on some routes between small island developing States in the Pacific have been greatly improved. For example, Kiribati Shipping Services Limited commenced a regular feeder service from Suva to Nauru and Tuvalu in June 2009. Logistics has also been improved owing to better communications infrastructure promoted through the Pacific Regional Digital Strategy, the Rural Internet Connectivity Scheme sites, the One Laptop Per Child initiative, and the South Pacific Information Network with six small island developing States as members. Another priority area is maritime pollution. The Pacific Ocean Pollution Prevention Programme and the Pacific Countries Ports Association are working together to implement Port Marine Spill Contingency Plans. Model legislation based on IMO and other international legal instruments on shipping and fishing has been adopted in modified form in the Cook Islands, Tonga and Tuvalu. Samoa is the latest to have enacted marine pollution legislation in 2008. Fiji and Vanuatu are advanced in their legal drafting process. The Pacific Ocean Pollution Prevention Programme has also formulated a Regional Strategy on Shipping-Related Invasive Marine Pests in the Pacific that was approved in 2006. In the Caribbean region, there has been an ongoing attempt to merge Air Jamaica with the Trinidad and Tobago Caribbean Airlines, in order to create a truly regional airline.

15. At the national level, most transport efforts have focused on port and airport development. Progress has often been constrained by lacking financing, and problems with costs and reliability of power grids and communications infrastructures, which was also a result of the topography of small island developing States. There has been limited scope for public-private partnerships and other forms of private sector involvement owing to the small market and revenue-raising opportunities. Yet, major progress has been achieved in some of the States. For example, the Nauru international airport now meets the international ICAO standards for fire-fighting capability, and has greatly expanded mobile voice and data services. A number of efforts of small island developing States in the road transport sector are also noteworthy. In Papua New Guinea, there is a dedicated road fund following the practice of certain emerging economies.[4] In Saint Lucia, motor vehicle and gasoline taxation has been successfully used to moderate energy use.

## C. Lessons learned

16. Despite all these efforts at the global, regional and national levels, the provision of reliable and efficient air, land and maritime transport services remains a challenge for many small island developing States, especially in the Pacific. This is due partly to the intrinsic characteristics of their small size, low transport volumes and geographical remoteness, and partly to issues that small island developing States share with other developing countries, such as limited capacity and financial resources.

17. Regionalism and regionalization in transport are important instruments for effectively addressing the challenges of small island developing States. However, no a priori good practice can be relied upon, as the costs and benefits and their distribution necessarily vary among regions and from initiative to initiative. In

[4] ESCAP Committee on Managing Globalization: fourth session, document E/ESCAP/CMG(4/1)/7, September 2007.

particular, international sharing of infrastructure as well as liberalization may produce hubs-and-spokes systems that benefit primarily the hubs, unless some kind of international sharing mechanism exists for the resulting costs and benefits. In this context, the discussions regarding the ongoing attempt to merge Air Jamaica with the Trinidad and Tobago Caribbean Airlines provide useful perspectives.

18. A logistics perspective that takes an intermodal view and also includes relevant communication and power infrastructures may prove most useful. In this respect, important lessons may be learned from the vision of the Asian transport ministers expressed at the Economic and Social Commission for Asia and the Pacific Ministerial Conference on Transport, in Busan, Republic of Korea, in 2006.

19. Sharing of resources on technology, institutional solutions, regulation, and administration has proven a particularly low-cost type of cooperation.

# III. Waste management and chemicals

## A. Trends and emerging issues

20. Waste management systems in small island developing States as in other developing countries are coming under pressure because of increasing population, urbanization, changing consumption patterns, trade and seasonal tourism.[5] In particular, the volumes of domestic wastewater and solid waste have increased rapidly, as has the share of non-degradable and toxic materials. Municipal solid waste volumes are estimated to have doubled in the Pacific small island developing States in recent years. In contrast to developed countries and similar to other developing countries, typically more than half of the waste in small island developing States is organic. This underlines the importance of composting, designer fertilizer, and biogasification in contrast to incineration. Major problems include the pollution of groundwater, surface and marine pollution from land-based sources such as domestic sewage, industrial effluents and agricultural runoffs; inadequate sewage-treatment facilities (see E/CN.17/1998/7/Add.2);[6] the lack or poorly managed landfill sites; and the absence of capacity to handle hazardous and toxic wastes.

21. The waste issue has been more threatening for small island developing States than for other developing countries, in view of the low environmental and socio-economic carrying capacities of typically land- and resource-poor, and ecologically fragile small island developing States. In fact, current waste-management practices in many of those States have resulted in the degradation of coral reefs, seagrass beds, mangroves and coastal zones, as well as in health warnings about diseases and contaminated food supplies. Such developments threaten tourism and fisheries, which continue to have significant importance for the economies of most small island developing States, and might eventually even threaten food security in some of those States.[7] But even if the more dramatic impacts can be averted, the current

[5] R. R. Thaman, et al. 2003. *Wasted Islands? Waste and the Need for Integrated Waste Management in the Pacific Islands*. Paper presented at the Barbados Programme of Action + 10 Meeting of Experts on Waste Management in Small Island Developing States.

[6] Report of the Secretary-General on management of waste in small island developing States.

[7] See Report of the Alliance of Small Island States Meeting of Experts on Waste Management for Small Island Developing States: Addressing the Challenges of Waste Management in SIDS, 2003.

economic costs of solid waste are already very large in most small island developing States. For example, in Palau they account for 1.6 per cent of gross domestic product (GDP).[8]

22. Yet, significant progress can also be reported from many small island developing States in terms of improving waste management. For example, waste collection coverage in major cities in the Caribbean reached between 60 and 90 per cent of the population, with the exception of Haiti, where it was much lower. Some progress has been made with regard to sanitary landfills. Many small island developing States have already achieved the Millennium Development Goal target related to universal access to improved sanitation. According to a World Bank study of the Caribbean region, all but one Caribbean small island developing State had achieved at least 80 per cent access to sanitation with most beyond 90 per cent.[9] However, other reports highlight the insufficient sewage and wastewater facilities in small island developing States[10] and the high incidences of eutrophication due to dumping of sewage into rivers and coastal waters. For example, in Saint Lucia only 13 per cent of the population is connected to the sewage system.[11] In Haiti, there are hardly any sewage collection services, only 40 per cent of the population use latrines and septic tanks, and 80 to 90 per cent of the solids are dumped illegally into seas and rivers.[12] While the high costs of construction and maintenance of modern sewage treatment plants are an important constraint, it should be noted that cheaper biological treatment methods exist that are especially suited to tropical climates.

23. The special characteristics of small island developing States also limit the transferability of good practices from other developing countries. The economic viability of recycling efforts is constrained by the relatively small quantities of plastics, paper, cardboard, and organics produced at the national level, high energy costs, the distance to markets, high transport costs, and the lack of economic instruments to encourage diversion. Where land is sparse, incineration is often chosen as the only economically viable treatment option, which, however, typically turns out to be unsustainable in terms of both pollution and high costs.

24. Small island developing States are increasingly vulnerable to transboundary movement of hazardous wastes and chemicals which originate from land-based and ship-borne sources primarily from outside the exclusive economic zones of small island developing States. In particular, the large amounts of plastics in oceans as well as ship waste are matters of great concern to small island developing States, and have had destructive impacts on the marine ecosystems of those States.

25. Similarly, the use and disposal of even small amounts of a wide range of chemicals have tended to cause greater harm in small island developing States than

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[8] Secretariat of the Pacific Regional Environment Programme, 2005. *Solid Waste Management Strategy for the Pacific Region*.

[9] Caribbean Workshop on Sanitation, 2008, Report on Integration of Sanitation Policies into National Development Plans in the Caribbean Region.

[10] S. Heiliman and C. Corbin, Caribbean Environment Programme, UNEP. "Assessment of the State of the Environment Relevant to the GPA Source Categories in the Caribbean Small Island Developing States", 2004.

[11] Global International Waters Assessment. *Regional Assessment 3a for the Caribbean Small Island Subsystem*, 2004.

[12] Global International Waters Assessment. *Regional Assessment 4 for the Islands of the Greater Antilles*, 2004.

in other developing countries. This also includes the impact of the use of pesticides and fertilizer on scarce groundwater, rivers and coastal waters, and in terms of eutrophication due to high nutrient levels in water. The impact on key coastal industries and sustainable livelihoods of coastal communities has been detrimental in some small island developing States.

## B. Policies and programmes

26. At its twenty-second special session, on sustainable development of small island developing States, held in New York in 1999,[8] and the Mauritius Strategy,[13] the General Assembly emphasized the importance of good waste management as a strategic issue for the sustainable development of those States. Consequently, the Governments of those States have made significant efforts to meet the Millennium Development Goal target related to universal access to improved sanitation. Efforts have focused on programmes and projects, as only a small number of small island developing States have national sanitation policies.

27. The Basel Convention and other international conventions seek to address the threats from the transboundary movement of hazardous wastes and their disposal in small island developing States. These are complemented by regional conventions: the Bamako Convention (Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa) and the Waigani Convention (Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region). A similar convention does not exist for the Caribbean small island developing States.[10]

28. In the Pacific region, programmes to improve waste management have primarily focused on education and awareness-raising. Yet, planning and implementation tended to be insufficient and ad hoc,[7] which typically had little impact on changing behaviour.[8] The Secretariat of the Pacific Regional Environment Programme runs the South Pacific Regional Pollution Prevention, Waste Minimization and Management Programme, with land, coast and marine components, such as the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.[5] The Secretariat of the Pacific Regional Environment Programme coordinates regional initiatives on capacity-building and the development of a Pacific Regional Solid Waste Management Strategy.[8] Partners include the Ministry of Foreign Affairs of Japan, the Japan International Cooperation Agency, the New Zealand International Aid and Development Agency, the Australian Agency for International Development, the European Development Fund, the UNEP Global Programme of Action for the Protection of the Marine Environment, the UNESCO Institute for Water Education, the Secretariat of the Pacific Community, the South Pacific Applied Geoscience Commission, WHO and UNEP.

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[13] See *Report of the International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Port Louis, Mauritius, 10-14 January 2005* (United Nations publication, Sales No. E.05.II.A.4), chap. I, resolution 1, annex II.

29. In the Caribbean region, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines have developed national solid waste management acts, but public health acts remain the most common legislative instruments in terms of sanitation in most small island developing States in the Caribbean.[8] International, regional and bilateral initiatives have focused on marine environmental issues, and many environmental strategies, action plans and environmental agreements have been implemented and raised environmental awareness at the highest political levels. Examples of new regional initiatives, networks and agencies in the region include:[8] UNEP Caribbean Environment Programme;[14] Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region; Organization of Eastern Caribbean States Solid and Ship-Generated Waste Management Project;[6] Integrated Watershed and Coastal Management in Caribbean SIDS project; ReCaribe: Wider Caribbean Solid Waste and Recycling Alliance; CARIBSAN Regional Workshop on the Integration of Sanitation Policies in National Development Plans in the Caribbean Region; and Directory of Environmentally Sound Technologies for the Integrated Management of Solid, Liquid and Hazardous Waste for SIDS in the Caribbean Region.

30. In the Atlantic, Indian Ocean, Mediterranean and South China Seas (AIMS) region, effective national frameworks on waste management are the exception rather than the rule, and no significant regional programmes, policies or legal instruments can be reported. In Comoros, there is no systematic waste management system or waste management agency. In contrast, integrated solid waste management programmes were established in Mauritius and the Seychelles with support from the European Union Cooperation Programme. They include systematic collection, disposal, composting, recycling, and recovery, as well as private sector involvement. As a result, sanitary landfills are in operation in Mauritius and under construction in the Seychelles. The Seychelles also has advanced systematic composting for local and export markets and has discontinued the practice of open waste incineration (which is commonplace elsewhere in the region), and a special agency was created for solid and hazardous waste management, waste minimization and recycling. In the Maldives, UNDP supported the development of a national solid waste management policy. Generally, national environment management plans have been the primary drivers for solid waste management policies of small island developing States in the AIMS region. Waste recycling on a commercial scale in the region exists only in Mauritius, where plastics are recycled and bagasse is being used as a source of energy.

31. At the national level, a wide range of programmes and projects have been undertaken by small island developing States. For example, in Nauru and elsewhere, waste management was considerably improved through targeted infrastructure improvements in transport and sewage treatment. In many small island developing States, waste management policy and regulation continues to be fragmented geographically and conceptually, and Governments have tried to improve coordination within and between relevant government agencies (which proved a challenge especially when agencies were acting as both regulators and providers of services).[9] Many projects aimed at education and awareness-raising, with only mixed results in terms of changing actual behaviours. Saint Lucia and others have

[14] UNEP Caribbean Environment Programme, *Wastewater, Sewage and Sanitation*, 2008.

successfully implemented international standards in landfills and related facilities, ship-generated waste, and disposal of biomedical waste, batteries, and asbestos.

## C. Lessons learned

32. "One size does not fit all." While small island developing States share with other developing countries a range of common challenges in waste management, good practices in waste management are not necessarily transferable even between small island developing States. The best approach is one that is tailored to the unique combination of national characteristics.

33. The unmodified application of technologies and practices used in developed countries does not have good track records. The traditional technology-focused approach of developed countries requires efficient transport, significant financial resources, and physical space for landfills and wastewater treatment facilities, which is typically lacking in small island developing States. Thus, those States may adopt approaches that aim to develop waste as a "resource" from which social, economic and environmental benefits can be derived.[7] For example, composting of organic waste is a traditional practice in small island developing States that reduces waste and produces substitutes for chemical fertilizers. Other options include the conversion of waste materials into energy fuels and irrigation water through processes such as fermentation, thermal conversion, and low temperature pyrolysis.[7]

34. The Organization of Eastern Caribbean States solid waste management strategy is considered a best practice. This strategy can be complemented by the development of a system for evaluating existing waste management systems, in order to identify systems and models that are better suited to small island developing States.

35. UNEP has suggested the following elements of a strategy for small island developing States to increase their efforts in materials recovery and waste reduction:[15] launch educational campaigns; study waste streams (quantity and composition), which improves management and highlights opportunities for recycling; support source separation and recovery; facilitate small enterprises through new or amended regulations; assist waste salvagers; reduce waste via legislation and economic instruments; export recyclables and domestic recycling; promote innovation for the reuse of waste; reduce use of substances which produce toxic or hazardous waste.

36. Public awareness campaigns need to be long-term, multimedia campaigns associated with local livelihoods and community projects. Partnerships can decrease overall costs, even in the face of increasing overall levels of waste. Acquisition of new equipment needs to be supported by building local capacity to ensure sustainable maintenance.

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[15] UNEP, *Directory of Environmentally Sound Technologies for Waste Management in Pacific Small Island Developing States*, 2002, and *Directory of Environmentally Sound Technologies for Waste Management in Caribbean Small Island Developing States*, 2004.

# IV. Mining

## A. Trends and emerging issues

37. Significant extractive industries exist in very few small island developing States, where they are, however, of significant economic importance.[16] For example, 40 per cent of the GDP of Trinidad and Tobago is linked to oil and gas revenues, which also account for 80 per cent of exports.[17] Significant exporters of minerals include Jamaica (bauxite and alumina), Guyana (bauxite), Suriname (bauxite and alumina), the Dominican Republic (nickel), Cuba (nickel), and Papua New Guinea (copper and gold). On a smaller scale, Barbados, Fiji, Solomon Islands, Seychelles and others also engage in mineral extraction and export. The mining of aggregates, such as sand, gravel and limestone, for construction is important to the domestic economies of most small island developing States.

38. Artisanal and small-scale mining is practised alongside large-scale mining, accounting for a substantial segment of the industry in several small island developing States. For example, in Papua New Guinea, 90 per cent of miners are artisanal rural miners using traditional tools. In Suriname, nearly all gold is extracted by artisanal miners except for one large, foreign-owned gold mine.

39. Most recently, small island developing States have started exploring mining in continental shelf areas and exclusive economic zones. For example, offshore oil and natural gas reserves hold promise for Sao Tome and Principe, Timor-Leste, Barbados, and others. There is increased interest in deep-sea mining, especially for ferromanganese crusts and polymetallic sulphides in the exclusive economic zones of Papua New Guinea, Fiji and Tonga. In 2008, Nauru and Tonga became the first small island developing States to apply to the International Seabed Authority for exploration permits for polymetallic nodules in international seabed areas.

40. Mining activities have significant environmental and socio-economic impacts. Extractive industries in small island developing States contribute to employment generation, poverty reduction, and rural development. In practice, however, the positive effects depend on the quality of existing institutions, policies and legislation. While that situation is common to many developing countries, the high vulnerability and small size of small island developing States typically make them more susceptible to negative impacts. Energy and water use for mining and the waste released in the process quickly puts pressure on fragile ecosystems. Soil erosion, land degradation, deforestation, biodiversity loss, toxic pollution, watershed contamination, and resulting health risks and displacement of communities are typical impacts of mining in small island developing States. For example, land degradation in Nauru, due to a century of open cast phosphate extraction, has left more than 70 per cent of its land barren and unsuitable for agriculture.[18]

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[16] For the purposes of the present report, extractive industries are defined as primary activities associated with the extraction of non-renewable resources. These resources belong to one of three categories of minerals: energy minerals (oil, gas, coal, uranium), metallic minerals, and non-metallic minerals (industrial and construction minerals and precious stones).

[17] World Bank country brief.

[18] Nauru, first national report to the Conference of States Parties on the implementation of the United Nations Convention to Combat Desertification.

41. Toxic substances such as cyanide, mercury and sulphuric acid are typically used to separate metal from ores, leaving residues in the tailings. Artisanal and small-scale gold mining in Guyana, Suriname, Papua New Guinea, and elsewhere continues to use the mercury amalgamation process, which leads to highly toxic mercury becoming a persistent contaminant circulating in the atmosphere, water, sediments, soil, and living organisms, causing damage to the human nervous system and organs. The extraction of sand, coral and other aggregates from beaches and nearshore reefs increases coastal erosion and can cause marine pollution. However, sand mining has been in line with local traditions of people building their own homes.

42. In some cases, mining has led to the creation of a dual economy, detrimental social disruptions (e.g., family breakdown, violence, prostitution, substance abuse), geographic dislocations, and pollution. In areas where large-scale mining companies compete with artisanal and small-scale miners, the ambiguity of regulations and their inconsistent enforcement has led to conflict and social instabilities. For example, in Papua New Guinea, it is estimated that 30 per cent of artisanal and small-scale mining workers are children.[19] Indigenous communities have been particularly vulnerable to the disruptive effects of mining.

43. Most small island developing States that benefited from financial inflows due to mining profits have suffered from the "Dutch disease" phenomenon. They have typically focused their economic development singularly on the once-lucrative mining industry at the expense of other productive capacity. Transparency regarding the receipt and allocation of mining revenues continues to be a concern in many small island developing States. Closely related are the social, economic and environmental considerations of mine closure. For example, the planned closure by 2013 of the Ok Tedi mine in Papua New Guinea raises these issues for some 50,000 people who rely on the mine for their livelihoods.

## B. Policies and programmes

44. At the global level, regulatory systems have been created to address the environmental, economic, and social impacts of mining. The Dominican Republic, Jamaica, Papua New Guinea, and Suriname are members of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development. Sao Tome and Principe, and Timor-Leste are candidate countries[20] of the Extractive Industries Transparency Initiative, a multi-stakeholder coalition that supports increased accountability and improved governance in resource-rich countries through the disclosure of company payments and government revenues from oil, gas and mining. The United Nations Declaration on the Rights of Indigenous Peoples sets minimum standards, including the requirement that mining enterprises obtain the free, prior and informed consent of relevant communities before operating on indigenous lands. However, the practice in some small island developing States has diverged from these international standards.[21] A number of global efforts have addressed mercury pollution

[19] Geoff Crispin, "Environmental management in small scale mining in PNG", *Journal of Cleaner Production*, Volume 11, Issue 2, March 2003, pp. 175-183.

[20] A candidate country is one that has fully and to the satisfaction of the Board of the Extractive Industries Transparency Initiative met the sign-up indicators (see http://eitransparency.org/countries/candidate).

[21] Minority Rights Group International, World Directory of Minorities and Indigenous Peoples — Guyana.

from artisanal and small-scale gold mining in small island developing States. For example, the UNEP mercury programme and the Global Mercury Project have undertaken projects in Suriname and in Guyana. In 2008, the European Parliament and the Council of the European Union banned exports of metallic mercury and certain mercury compounds.

45. In the Pacific region, seabed mineral mining is emerging as a potential industry which has led small island developing States to consider developing regulatory frameworks. It should be noted that the International Seabed Authority regulates mining outside the territorial sea, the exclusive economic zones, and continental shelf of individual small island developing States. Existing national regulatory frameworks that govern these areas are primarily concerned with living resources, especially fisheries, and national legislation specifically governing mining is applicable only to onshore exploration, with little or no attention to offshore areas. The Madang Guidelines of the South Pacific Applied Geoscience Commission provide a set of international standards on offshore prospecting, which have been used by Fiji and others in considering national policy on the subject. Fiji, Papua New Guinea and other small island developing States have attempted to formalize artisanal and small-scale mining through legal frameworks, but the enforcement of these laws remains a challenge.

46. In the Caribbean region, comprehensive and enforceable national policies on mining exist in very few small island developing States. Trinidad and Tobago, Suriname and Guyana all have mining laws. In Jamaica, mining is covered by the Natural Resources Conservation Authority Act. Barbados offers non-binding recommendations to mining companies operating in good faith. Cuba approved a national mining policy in 2008, covering quality systems, environmental protection, mine closure, and environmental liabilities. Conflicts of interest between local communities and government interests with respect to environmental impact assessments are contentious in many small island developing States.

## C. Lessons learned

47. Owing to the vulnerabilities of small island developing States and their dependency on marine resources, integrated approaches to governance are needed that include mining, fisheries, biodiversity, energy, and shipping. Quantitative and qualitative assessment may need to take into account interlinkages that are typically more important for small island developing States than for other developing countries. Furthermore, artisanal and small-scale mining needs to be included in the development strategies of small island developing States, while making clear distinctions between artisanal and small-scale mining that concern subsistence activities and those that entail small commercial undertakings.

48. Based on their experience in the mining sector, small island developing States have identified the following areas for priority action: (a) improve national capacity for policy formulation, negotiations, evaluation and enforcement; (b) ensure that full cost-benefit analysis and environmental impact assessment of potential mining sites are undertaken; (c) establish fair and transparent compensation systems to mitigate natural resource loss, environmental damage, and socio-economic costs; (d) legislate, manage and enforce national mineral policy frameworks and environmental management plans; (e) develop institutional capacity on mining

tenement issues, company selection, closure, and institutional weaknesses; (f) assess resources and develop mineral databases; and (g) increase stakeholder participation.

49. In particular, institutional and capacity gaps in the government agencies responsible for coordination, contracting and monitoring of the extractive industry sector need to be addressed. Increased transparency by Governments and efforts to develop open information systems can help especially with the socio-economic and sustainability issues. However, they also make good economic and business sense promoting sustainable investments and technology transfer. In fact, even mining companies increasingly recognize that early community engagement and free, prior and informed consent are indispensable business practices. The Governments of small island developing States may consider incorporating free, prior and informed consent into plans for mineral development.

50. Experience with closer regional cooperation, especially among Governments in the Pacific as well as in the Caribbean regions, has been considered low cost and high impact. In the mining sector, intergovernmental dialogue is needed especially on the seabed mining in the exclusive economic zones and extended continental shelves of small island developing States.

# V. Sustainable consumption and production

## A. Trends and emerging issues

51. Sustainable consumption and production is defined as "the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardize the needs of future generations".[22] Thus, sustainable consumption and production is a broad and cross-cutting concept that requires wide stakeholder involvement at all levels of decision-making. Sustainable consumption and production provides a useful perspective on the sustainability of the development progress of small island developing States, in view of their high vulnerability.

52. In recent years, there have been a number of sustainable consumption and production projects and initiatives in small island developing States that have indicated what is possible. However, these actions have rarely been enough to make a real difference at the national and regional levels. This is evidenced by all kinds of eco-efficiency measures when applied to the economies of small island developing States and compared to larger developing countries.

53. One popular measure is that of the ecological deficit/surplus of countries,[23] which refers to the difference between the ecological footprint (a measure of how much productive land and water is required to produce all the resources consumed and to absorb all the waste generated per year using prevailing technology) and the biocapacity of a country (the total biological production capacity per year of a given area). The ESCAP State of the Environment Report has cited ecological deficits and surpluses of countries in Asia and the Pacific. Although the measure is available for

[22] Definition adopted at the Commission for Sustainable Development International Work Programme in 1995.

[23] Global Footprint Network (www.footprintnetwork.org).

only a few small island developing States and related territories, the results (where available) are not encouraging. Based on the 2009 national footprint accounts, Cuba, the Dominican Republic, Haiti, and Fiji reported significant ecological deficits, in contrast to typical surpluses of larger developing countries with similar incomes. Guinea-Bissau, Papua New Guinea, and the Solomon Islands showed small surpluses. Unfortunately, in most small island developing States the balance has continuously worsened in recent years, as the biocapacity decreased continually and the ecological footprint typically increased or decreased only slightly (e.g., Guinea-Bissau). Decreasing footprints were typically caused by significant economic decline (e.g., Haiti) rather than by successful eco-efficiency measures.

54. Greenhouse gas emissions have received great political attention from the Governments of many small island developing States. Yet, emissions have continued to increase, and even the progress in terms of $CO_2$ intensity has been rather limited, as evidenced by the World Bank for 29 small island developing States. Carbon dioxide intensity decreased for only 14 small island developing States and increased for 15 of them in the sample from 1990 to 2005. For comparison, the $CO_2$ intensity for East Asia and the Pacific region as a whole reduced considerably faster than in most small island developing States.

## B. Policies and programmes

55. Sustainable consumption and production policies and programmes in small island developing States have sought to improve the health and environmental impacts of products and services; to raise awareness; to plan sustainable infrastructure investments; and to enhance corporate environmental and social responsibility and accountability.

56. At the global level, the Marrakech Process supports the elaboration of a 10-Year Framework of Programmes on sustainable consumption and production, as called for by the Johannesburg Plan of Action of the World Summit on Sustainable Development. The Marrakech Process is led by the Department of Economic and Social Affairs of the United Nations Secretariat and UNEP in partnership with Governments and organizations. Important elements of the Marrakech Process include the establishment of cleaner production centres, the development of thematic task forces, and the pursuance of regional and national approaches to sustainable consumption and production.

57. Cleaner production refers to the reduction of environmental impacts from processes, products and services by using better management strategies, methods and tools. UNIDO-UNEP national cleaner production centres are building capacity and awareness in developing countries. A knowledge management system links members of the UNIDO cleaner production network in more than 30 countries. In Cuba, pilot cleaner production projects have reduced production costs by $18 million, energy costs by $3.4 million and water costs by $2.4 million. In Mauritius, a national cleaner production centre was established in 2009. The Caribbean Environmental Health Institute in close collaboration with the Caribbean Community (CARICOM) implements a cleaner production project to familiarize smaller enterprises with cleaner production practices.

58. The Tourism Task Force is one of seven task forces under the Marrakech Process, which are voluntary initiatives led by Governments and partners from

developing and developed countries. Tourism is of great importance for many small island developing States. The Tourism Task Force has completed a three-year programme of work and has submitted 27 projects, including pilot adaptation projects in small island developing States. Activities have been undertaken in Fiji and the Maldives funded by the Global Environment Facility. The projects address inter-ministerial coordination, streamlined regulation, impact assessment, and climate information for long-term strategic tourism planning, and include practical measures at selected sites on erosion control, water and waste management, coastal ecosystems, and health.

59. In the Caribbean region, small island developing States identified a number of sustainable consumption and production priority areas in 2008, including tourism, financial and ecosystem services; energy diversification, small and medium-sized enterprises; construction codes; climate change adaptation; national multi-stakeholder dialogue; national sustainable consumption and production strategies; and sustainable public procurement. Examples of national sustainable consumption and production strategies or the inclusion of sustainable consumption and production elements into national development strategies were reported from Barbados, Cuba, Dominica, and Jamaica. In Barbados, the Sustainable Development Policy highlights the principles of quality of life, conservation of resources (including the "polluter pays" principle), economic efficiency and equity. The National Strategic Plan for 2006-2025 seeks to build a "green economy", and ministries are also undertaking sectoral assessments of sustainable consumption and production initiatives. In Cuba, the National Cleaner Production and Sustainable Consumption Strategy, adopted in 2004, has emphasized the management of water resources, energy, waste and industry as priority areas for changing existing consumption and production patterns, and the strategy is monitored with quantitative indicators. In Dominica, instead of a dedicated national sustainable consumption and production strategy, the National Environmental Management Strategy and Action Plan emphasizes the priority areas of management of land and sea, waste, disaster, and climate change, and the sustainable tourism policy takes into account forestry, wildlife and water resources, biodiversity, national parks, eco-tourism sites, tourism standards and certification processes. In Jamaica, the National Environmental Action Plan 2006-2009 includes a section on sustainable consumption and production which refers to a demand-side management programme for the power sector, including energy-efficient production, building codes, and tax concessions for solar-powered water heating.

60. In the Pacific region, only a few small island developing States have developed specific sustainable consumption and production national strategies. However, many significant regional sustainable consumption and production actions have been taken collaboratively. They range from the adoption of a green growth approach, the Pacific Plan, the Bulk Procurement of Petroleum Initiative, and the successful promotion of renewable energy to the establishment of the Asia-Pacific regional Help Desk on Sustainable Consumption and Production in 2006, and the round table on sustainable consumption and production in 1998 (which provides practical tools and thematic working groups). In 2005, 11 Pacific small island developing States jointly (with other ESCAP members) adopted the green growth approach at the fifth ESCAP Ministerial Conference on Environment and Development. The green growth concept has led to initiatives to increase eco-efficiency of production and consumption in small island developing States in

an attempt to successfully achieve Millennium Development Goals 1 and 7. The Pacific Plan for Strengthening Regional Cooperation and Integration of 2005 is the overarching political framework of Pacific small island developing States, expressing shared goals and development priorities, as well as regional priorities. The Bulk Procurement of Petroleum Initiative seeks to capture savings and benefits and to reflect energy security goals and priorities as set out in national energy policies and the Regional Pacific Islands Energy Policy. It is an initiative of the Cook Islands, Nauru, Niue, and Tuvalu, with Tonga and Solomon Islands having indicated their interest in joining. The promotion of renewable energy technologies has been high on the agenda of Pacific small island developing States. In Fiji and Vanuatu, national energy policies promote production of biofuels through planting on degraded lands, the Government of Vanuatu uses coconut oil (blended with diesel or kerosene) for its vehicle fleet, and in the Marshall Islands there are some cars and boats running on coconut oil. The oil will also come from outer islands once mini-electricity systems have been installed for processing copra into oil. In several Pacific small island developing States, a number of large-scale project proposals for waste-to-energy facilities are under consideration.

61. In the AIMS region, progress towards sustainable consumption and production has been reported from Mauritius, Sao Tome and Principe, and Comoros, in terms of national sustainable consumption and production frameworks and related progress in specific areas, such as energy use, green procurement, and education. For example, in Mauritius, the National Programme for Sustainable Consumption and Production (2008-2013) identifies 7 themes and 44 projects amounting to a total of $1 million. In Mauritius, in 2009 a project was started to implement the sustainable public procurement approach of the Marrakech Task Force on Sustainable Public Procurement. In Mauritius, a comprehensive energy efficiency bill is currently being prepared that will apply to all sectors. In Comoros, sustainable consumption and production actions have focused on reducing oil import dependence and increase energy access. In Comoros as well as in Sao Tome and Principe, eco-tourism programmes have been carried out. In Mauritius, the Education and Communication for Sustainable Lifestyles Project under the National Programme on Sustainable Consumption and Production will help inclusion of learning objectives on sustainable lifestyles in the primary and secondary school curricula.

## C. Lessons learned

62. While many good sustainable consumption and production projects and initiatives have been undertaken in small island developing States, the overall progress has been much slower than most policymakers in small island developing States would have wished for. In part, that is due to the continuing disconnect between overall policies and actual projects, lacking capacity and resources, and simple product affordability issues for low-income groups. It is more difficult in small island developing States than in other developing countries to compromise on direct cost issues, since overall per capita costs are already considerably higher owing to the small size and remoteness of small island developing States.

63. The green growth approach recently adopted by Pacific small island developing States may be a useful integrated approach for all such small island developing States to reinforce both economic growth and sustainability. It appears the most promising approach to replace the old paradigm of "grow first, clean up

later". Instead, the green growth focus on improving eco-efficiency promotes environmental sustainability, performance and environment as an asset for growth and development.

## VI. Continuing challenges

64. A wide range of continuing challenges persist in all areas reviewed in the present report: transport, waste management and chemicals, mining and sustainable consumption and production. Many of these challenges are specific to small island developing States, others are merely more serious in relative terms compared to other developing countries. Key examples of challenges for small island developing States and lessons learned include those described below.

65. The provision of reliable and efficient air and maritime transport services remains a challenge for many small island developing States, especially in the Pacific and for poorer small island developing States, as well as for remote islands within small island developing States. Regionalism and regionalization in transport are important instruments for effectively addressing the challenges of the small size, low transport volumes and geographic remoteness of such States. Simple transfer of good practices from other developing countries may not work well in small island developing States, as evidenced by the distributional effects of emerging hub-and-spokes systems. However, the current low logistics performance of most small island developing States also implies that significant improvements are achievable nevertheless.

66. While small island developing States share with other developing countries a range of common challenges in waste management, good practices in waste management are not necessarily transferable even between small island developing States, as "one size does not fit all". Furthermore, the unmodified application of technologies and practices used in developed countries does not have good track records, as it requires efficient transport, significant financial resources, and physical space for landfills and wastewater treatment facilities, which is typically lacking in small island developing States. These States may learn most from good practices of local governments elsewhere. Promising approaches include composting of organic waste, which produces substitutes for chemical fertilizers, as well as conversion of waste into energy fuels and irrigation water through fermentation, thermal conversion, and low temperature pyrolysis. Transboundary movement of hazardous wastes and chemicals are very important emerging challenges for small island developing States, which they share with many other developing countries.

67. In the mining sector, institutional and capacity gaps continue in the government agencies responsible for coordination, contracting, and monitoring of the extractive industry sector. Increased transparency, early community engagement, and free, prior and informed consent are indispensable to both Governments and businesses. Owing to the vulnerabilities of small island developing States and their dependency on marine resources, integrated approaches to governance may be needed that include mining, fisheries, biodiversity, energy, and shipping. Quantitative and qualitative assessment may need to take into account interlinkages that are typically more important for small island developing States than for other developing countries. Furthermore, artisanal and small-scale mining needs to be

included in the development strategies of small island developing States, while making clear distinctions between artisanal and small-scale mining that concern subsistence activities and those that entail small commercial undertakings. Experience with closer regional cooperation, especially among Governments of States in the Pacific as well as in the Caribbean regions, has been considered low cost and high impact. In the mining sector, intergovernmental dialogue is needed, especially on the seabed mining in exclusive economic zones and extended continental shelves of small island developing States.

68. Continuing sustainable consumption and production challenges for small island developing States include the disconnect between overall policies and actual projects, lacking capacity and resources, and simple product affordability issues for low-income groups, especially in view of the already considerably higher costs in small island developing States because of their small size and remoteness. The green-growth approach recently adopted by Pacific small island developing States appears the most promising approach for all small island developing States to reinforce both economic growth and sustainability and to replace the old paradigm of "grow first, clean up later".